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POST-OPERATIVE DISTRESS IN CASES OF SENILE CATARACT*

BY

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THE subject of my address is:—"The causes and treatment of post-operative distress following operation for cataract, other than that due to surgical complications."

The pre- and post-operative management of senile cataract was discussed at the meeting of The Ophthalmological Society at Edinburgh in 1932, but most of the speakers confined themselves to discussion of surgical complications, and only a few referred briefly to the problems I propose to discuss at some length this evening.

Probably we have all been told by patients after convalescence that the actual operation was not nearly such an unpleasant experience as they expected, but that the few days following it were extremely trying. Many have had such a bad time during this period, that dread of a repetition of the experience makes them most unwilling to undergo a second operation if such becomes advisable. This post-operative distress is partly physical and partly mental, and physical and mental factors react one upon the other.

* Presidential Address, Section of Ophthalmology, Royal Society of Medicine, October 9, 1936.

Physical distress.—Apart from pain in the eye, which in the absence of surgical complications is usually only slight and of short duration, the physical symptoms which cause the most frequent and severe distress are, (1) pain in the back, and (2) abdominal discomfort, usually associated with flatulence.

Pain in the back, often very severe, occurs in nearly all patients who are kept for long lying motionless on the back with a low pillow. For most people this is an unaccustomed position and probably subjects various structures in the back to unusual stresses, especially if the bed is fitted with a chain spring mattress covered with a rather unyielding hair or composition overlay. The sagging of a slack chain mattress into a hammock-like shape increases discomfort by causing hyperextension of the knees. Prolonged immobility in any position, especially if enforced, proves irksome, and is liable to cause sensations of cramp in body or limbs. It is probable, therefore, that the perfect stillness commonly enjoined aggravates the effects of unaccustomed stresses. It may be, too, that many patients, trying to keep quite still in an uncomfortable position, do not relax completely, and unconscious contraction of some of the muscles of the back, leading to fatigue and cramp, may be a further factor causing pain. The use of a good spiral spring mattress, with an overlay of the type containing numerous small spiral springs, a cushion beneath the small of the back, and a pillow beneath the knees may delay the onset and lessen the severity of the pain, but I have found it impossible to prevent or relieve it in many cases so long as the patient is kept flat on the back.

Next to pain in the back the commonest form of post-operative physical distress is abdominal pain associated with flatulence. It is not altogether easy to explain why our patients suffer in this way. Indeed, surprisingly little seems to be known about the causes of flatulence. The subject was discussed at some length by Victor Bonney nearly two years ago in his Bradshaw Lecture on "Functional Derangements of the Intestine that follow Abdominal Operations." He was, of course, discussing degrees of flatulence much more severe than we see in our cases, but I have to thank him for a very valuable summary of the facts known with regard to the origin and disposal of gases in the digestive tract. At Oxford last July the Section of Medicine of the British Medical Association discussed the subject of Epigastric Discomfort and Flatulence. I attended that meeting and learned several further facts which help, I think, to throw light on our problems.

As regards the origin of the gases in the digestive tract it appears that they are derived from three sources, swallowed air, gases diffused from the blood, and gases formed by chemical

changes in the contents of the stomach and intestines. A considerable quantity of air is normally taken into the stomach during the swallowing of food. Bonney mentioned experiments made by Douglas MacLeod and Kremer, which showed that the quantity of air taken into the stomach during the swallowing of food was not only very definite, but was greatest with the individual lying down, an observation of considerable interest from our point of view. T. C. Hunt at Oxford also demonstrated that some air was normally swallowed with every mouthful of food. He showed an X-ray photograph in which a fairly large bubble of air could be seen in the oesophagus accompanying a bolus of opaque material. Ryle and others mentioned that aerophagy often occurred in states of anxiety or emotional disturbance, quite apart from hysteria. This statement is also significant to us, for our patients are often in a state of great anxiety and emotional tension after operation. Hurst said that a patient with epigastric discomfort, in attempting to relieve himself by bringing up the wind, often, in fact, swallowed air. As some indigestion, frequently perhaps a form of nervous dyspepsia, is by no means rare in our cases, it may be that they sometimes increase their flatulence in this way. The contribution made by diffusion of gases from the blood through the mucous membrane into the stomach and intestine consists chiefly of CO_2, and it is probable that no excess from this source occurs in our patients. The contribution normally made by chemical action is not known. The neutralisation in the intestine of the acid contents of the stomach must furnish a very definite quota. Gases like CH_4 and H_2S, when present, must result from chemical action, but they are occasional only. Hurst referred to distension of the colon resulting from decomposition of undigested starch. It is possible, therefore, that a diet containing much starch given to a patient whose digestive powers are not functioning well, may help to cause painful distension.

Under normal conditions the introduction of gas into the digestive tract and its formation therein are balanced by absorption into the blood and by onward passage effected by peristalsis. Peristalsis assists removal of the gases in two ways. It moves them on, so bringing them in contact with a larger absorbing area of mucous membrane, and eventually it leads to their passage to the exterior. Peristalsis is much diminished when a person is lying still in bed. I have been told by a medical colleague that the lessening of peristalsis is so considerable that when making X-ray examinations after an opaque meal, it is necessary to allow patients to get up and walk about in order to obviate misleading results.

The relaxation of the abdominal muscles when lying in bed by lessening the external pressure on the bowel may perhaps favour the accumulation of gas in the lumen.

Ballantyne at Edinburgh suggested that flatulence might sometimes be due to starvation, and certainly the absence of the stimulus to peristalsis excited by taking food, would be expected to favour accumulation of gas.

It seems to me probable that the chief causes of flatulence in our patients may be increased swallowing of air due to feeding while lying flat, aerophagy due to anxiety, and diminished peristalsis due to prolonged immobility in the supine position. Although distress from this cause may be mitigated by careful dieting and the use of various carminatives, practical experience proves that no measure is so effective in preventing and relieving it as allowing the patient to be propped up in bed at an early stage, and to be turned on his side and to draw up his knees.

Mental distress.—The post-operative period must inevitably be a time of very great anxiety for any but the most phlegmatic patient. We may be able to assure him that all goes well, but some time must elapse, even in the most favourable case, before we can state positively that he will see well again. The degree of post-operative mental distress depends in no small degree upon the pre-operative handling of the patient. Ballantyne discussed this briefly in his opening to the discussion at Edinburgh and I very strongly support practically everything he said. I cannot do better than quote the words in which he summarised his views. "In the waiting period before operation it should be our endeavour to keep the patient as active as possible, to preserve his normal interests and social contacts, and to keep him in good spirits. We can assure him that he has nothing to fear in the operation, that it will be painless, that the only suffering will be the irksomeness of a few days quiet rest in bed, and that we shall do all that is possible to mitigate the discomforts of that period."

When the time for operation arrives everything possible should be done to minimise the mental strain suffered by the patient. He should be in the home just long enough before the operation to become acquainted with his surroundings and the nurses. A mild hypnotic or sedative the night before operation does good by ensuring a good night's sleep, but I prefer not to have a sedative given on the day of operation, as I think patients behave better if they are mentally alert at the time of operation. The patient having been brought to the theatre in as confident and optimistic a mood as possible, the operation should be completed without haste, but as quickly as is consistent with safety. For this reason I deprecate any elaboration of technique which cannot be shown to be certainly advantageous. I like to be able to complete the operation while the patient thinks one is still engaged only with preliminary details, and then to tell him it is over and that all has gone well. I am sure that the less these old people are fussed and bothered the better they settle down afterwards.

Apart from the inevitable anxiety during the first few days after operation, the two chief causes of mental distress are the immobility commonly insisted upon, and the binocular bandage.

There can be no doubt that the mental strain of the first few days is considerably aggravated by insistence on immobility. The patient often worries lest he should inadvertently make some slight movement which will imperil his chances of recovery. I have sometimes found one in the depths of gloom because he had moved a little during the night, and feared he had thus ruined his eye.

In the past, absolute immobility was generally supposed to be so important that severe forms of physical restraint were employed, such as fixation of the head and limbs by sand bags. I thought this practice was quite obsolete, but found it recommended in a handbook of ophthalmic nursing published in this country as recently as 1933. To my mind it is little better than a method of slow torture, only justifiable by incontestable proof of its necessity, and certain to cause severe mental and physical distress.

Less drastic methods of physical restraint can be employed in some cases without causing any distress, such as tying the wrists by long loops of bandage passed beneath the bed-clothes to the foot of the bed, and adjusted so that the hands cannot be brought up above the level of the chest, but can be moved freely below that level. The object of this is, of course, merely to prevent the patient rubbing his eye, and it is probably sufficient to tie only the hand on the same side as the eye operated upon. But the mildest form of restraint worries some people extremely, and is unnecessary if the eye is well shielded and a watchful nurse is in charge.

The binocular bandage may cause great distress. Many patients do not mind it. Others seem to dread it more than anything else in connection with the operation, and it is certainly a factor in causing the mental derangement that occasionally follows cataract extraction.

It seems, therefore, that the chief causes completely under our control of both physical and mental post-operative distress, are the maintainance of prolonged immobility in the supine position and the binocular bandage. We must, then, consider whether these measures are necessary, and, if so, to what extent.

What are the post-operative risks that can be influenced by the system of nursing? These are, I suggest:—

(*a*) Direct injury to, or pressure upon the eye forcing open the wound or interfering with exact co-aptation of its margins;

(*b*) Increase of intra-ocular pressure, tending to force open the wound; and,

(*c*) Intra-ocular haemorrhage.

(*a*) Direct injury to the eye. This is most often caused by the patient getting his finger beneath the dressing and rubbing the eye. This risk is not minimised by keeping the patient on his back unless his hands are tied. A well fitting shield is a great protection, but some patients will get a finger beneath almost any shield, and a restless one may get the shield shifted so as to press on the eye. By far the best safeguard is a watchful nurse by the bed-side. If a patient gets out of bed he may stumble or fall and strike the eye against some hard object. Watchful nursing is again the only sure safeguard.

(*b*) Increase of intra-ocular pressure. I believe that apart from external pressure on the globe the only causes of increased intra-ocular pressure, which are in any degree under our control, are a rise of pressure in the intra-ocular blood vessels and haemorrhage into the eyeball.

(*c*) Intra-ocular haemorrhage. The cause of this is often obscure, but apart from direct injury I can think of no cause that can be influenced by the system of nursing other than a rise of pressure in the intra-ocular blood vessels, especially in the veins and capillaries.

There can be no question, then, of the importance of preventing increase of intra-ocular blood pressure, especially sudden increase. Leonard Hill, in 1912, showed members of this Section how easily intra-ocular haemorrhage was caused in a cat's eye, after allowing the aqueous to escape, by pressure on the abdomen. It is obvious, therefore, that strong contraction of the abdominal muscles is to be avoided, as in coughing, sneezing, vomiting, straining at stool, or sitting up unaided. The importance of this has, of course, been long recognised, but I do not think that in the past sufficient consideration has been given to the question of keeping down the pressure within the blood-vessels of the eye throughout the first few days of convalescence. Some time ago I asked a cardiologist, T. F. Cotton, in what position he considered a patient should be placed with a view to keeping the intra-ocular blood pressure as low as possible. He advised a semi-recumbent posture, such as is adopted in the treatment of cases of head injury. I also asked if he thought appreciable changes of pressure were likely to be caused by allowing a patient to move his limbs or even to turn on his side in bed. He considered that only negligible changes would be so produced, changes far smaller than those that might result from emotional disturbance or anxiety, which might indeed be of serious degree.

It seems, then, that there is no theoretical reason to insist upon

a more or less prolonged period of immobility on the back after cataract extraction, but that a semi-recumbent position should be preferable and that gentle movement of the body and limbs should cause no harm.

To turn next from theoretical considerations to the teachings of practical experience. For many years a few ophthalmic surgeons have questioned the value of the traditional system of nursing, and some have even gone so far as not to keep their patients in bed at all. In this country, for instance, Johnson Taylor of Norwich used to operate for cataract in his consulting room, and allow his patients to walk home afterwards: and his results were said to be very good. More than 30 years ago William Lang told me that he had allowed his private patients to sit up in an arm-chair the day after operation. When I was a house surgeon at the Royal Westminster Ophthalmic Hospital, 35 years ago, nearly all the patients walked back to the wards from the theatre, and half of them had to negotiate a long double flight of stairs to reach the next floor. I never saw any ill effects from this. But once back in bed they had to submit to the usual routine of immobility.

The use of a less severe régime appears to be gaining ground slowly both at home and abroad. At Edinburgh two speakers, Ballantyne and Doyne, expressed a preference for a reclining or semi-recumbent position, and enquiries among colleagues indicate a general tendency to adopt less rigorous measures. But judging from statements in textbooks, and still more from the practice of nurses trained in various eye hospitals, it seems that a decidedly strict régime is still generally enforced. I find that all nurses trained in ophthalmic work, unless given definite instructions to the contrary, consider it their duty to keep the patient absolutely still on his back with only a low pillow for two or three days after the operation, and that they try to impress upon the patient the great importance of strict immobility.

In order to ascertain the methods in use to-day in other countries, I have consulted several foreign textbooks and also addressed personal enquiries to ophthalmic surgeons practising in different parts of the world, Austria, France, Germany, Holland, Sweden, Switzerland, Canada and the United States. I found that considerable differences prevailed in the practice of different surgeons, but that on the whole the methods employed were less severe than in this country. The régime adopted by Löhlein of Berlin, approximates most closely to that usual in Great Britain.

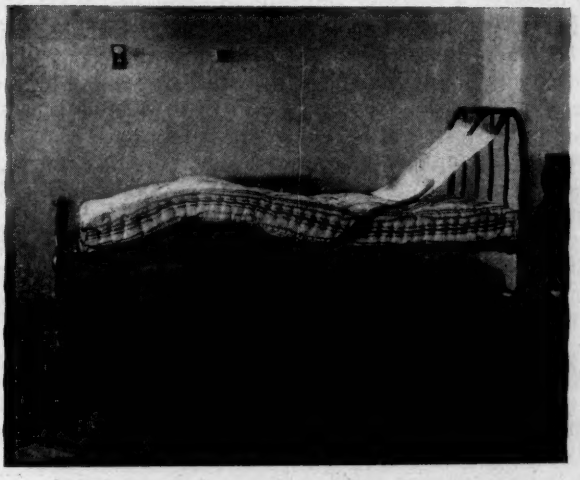
He keeps his patients on the back for one or two days, according to the danger of hypostatic pneumonia, after which he allows them to be propped up in bed. On the second or third day he permits them to get out of bed with careful help, to use the night stool at

the side of the bed, and also on the second or third day allows them to be turned on the side opposite to the eye operated upon.

The least exacting régime of which I received an account is that which Dr. Fischer, one of Prof. Meller's assistants, tells me is employed at Vienna. There the patient is propped up in bed immediately after operation, and the next day is allowed to turn his head on to the unoperated side and even to get out of bed. Nordensen's practice is only slightly more strict. Others adopt régimes of degrees of severity intermediate between the extremes quoted.

For many years I have in private practice adopted a routine less severe than that commonly taught in this country, and for the last few years I have allowed hospital patients, also, an easier time. Immediately after operation I like a patient to rest in a thoroughly comfortable position, preferably semi-recumbent; but if he feels he would rather lie flat I allow him to do so, but with not too low a pillow. I do not insist on his keeping perfectly still, but tell him he must not attempt to sit up, or turn on his side, without the help of a nurse. I believe it does no harm whatever to allow him, as soon as he begins to feel the dorsal position irksome, to be turned by the nurse on to the side opposite to the eye operated upon and to draw up his knees. A Fowler bedstead, making slight changes of position very easy without effort on the part of the patient is in many ways very convenient and comfortable, but we found at the Royal Westminster Ophthalmic Hospital that this type of bed was not popular with the nursing staff. They said that with it bed-making was more troublesome, and that it was not quite so easy to get at the patient's eyes for dressing.

The ordinary bed rest is not satisfactory, and we are now using a form of canvas sling to support the back first used for eye cases by Mayou several years ago at the Central London Ophthalmic Hospital. This sling keeps the patient supported most comfortably. Slipping down into the bed can be prevented, if necessary, by a pillow under the thighs, preferably placed beneath the mattress. We are now trying a bedstead with a mechanical arrangement for lifting the knees, while the back is supported by the sling. This seems likely to prove very satisfactory. The use of these slings and the general relaxation of the rigidity of the régime has almost completely eliminated complaints of backache, while abdominal discomfort and flatulence have become much less common. If the patient is comfortable and free from pulmonary symptoms, I prefer to keep him in bed for two or three days, but if he has any cough, or appears liable to develop chest trouble, or even if he finds bed very irksome, I let him be assisted into an armchair, making very little effort himself, on the day after the operation. If retention of urine occurs I allow him to be lifted into a



Bedstead with adjustable support for knees, and canvas sling for back.

sitting position on the edge of the bed, which may enable him to pass water, and obviate the necessity for catheterisation. After 48 hours I think it safe to allow the use of the night stool rather than the bed-pan, provided the patient is helped out of bed by a competent nurse.

With regard to the binocular bandage: as it sometimes causes much distress we must carefully consider whether its use is advisable, and if so, for how long. There are considerable differences of opinion among ophthalmic surgeons. Some have advocated so-called open treatment, using either no covering at all, or merely a thin layer of gauze resting lightly over the eye, or simply a shield without any dressing. They claim that the period of convalescence is thus rendered shorter and more comfortable, and that post-operative risks are not increased, but even in some respects diminished. My enquiries at home and abroad have shown, however, that in most clinics a binocular dressing is applied for a period of from one to four days. Personally I have never had the courage to try the open method of treatment. I feel that an eye ought to be kept completely at rest for a few days after operation and protected from the risk of direct injury. An eye cannot be kept at rest without closing both eyes, so I apply a binocular dressing for at least two or three days, unless the patient finds it very trying, or shows signs of mental derangement, or

develops conjunctivitis. If, however, he objects strongly to a binocular dressing I bandage only the eye operated upon and cover the other with a loose flap of lint or gauze, which he can lift up when he wants to see anything. He is told, however, to keep the eye closed except when he feels he must look around him, and the feeling that he can use the eye if he wishes is enough as a rule to set his mind at rest, and he will in fact rarely open it.

If mental derangement occurs one eye must, of course, be uncovered at once. And if conjunctivitis develops double flaps are used instead of pads.

It is customary to apply a monocular dressing for several days after the binocular dressing is discontinued. I am becoming more and more doubtful as to the advisability of this. A monocular dressing does not keep the eye at rest, and movement of the eye under even light pressure of a pad may be irritating. I suggest that after the first few days it is best for the patient to wear well fitted dark goggles during the day and a protective shield at night. The difficulty is to get goggles which are comfortable to wear and yet give adequate protection. For patients who can afford them it is best to have goggles made to fit before the operation. The stock sizes supplied to hospital patients seldom fit satisfactorily. I had hoped that a modification of the Kirkpatrick post-operative mask, made of tinted material, would prove satisfactory, as it gives the most complete protection to the eyes: but most patients find it hot and uncomfortable. I think, however, that it may be possible to modify it so as to overcome its disadvantages.

I have tried in this address to analyse the causes, both physical and mental, of post-operative distress, and have suggested that both theoretical consideration and practical experience show that such distress can be very largely prevented by adoption of a nursing régime less rigorous than that commonly enforced, and that the risk of complications is not thereby increased. Indeed, I believe the chances of a good result are materially improved by keeping a patient as far as possible comfortable and free from worry. It may be that I have been preaching to many already converted, but I hope that any who have not tried a considerable relaxation of the traditional régime will make the experiment, for by doing so I am sure they will prevent a great deal of very real suffering.

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THE OPTIC FORAMEN*

BY

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FORTY years ago affections of the optic nerve and the visual tracts were but inadequately understood. In fact, atrophy of the nerve, whether primary or secondary, was regarded almost as an act of God, and therefore unavoidable, and practically irresponsive to treatment. During the subsequent period great progress has been made in knowledge of its aetiology, and consequently in prophylaxis and remedial measures. One of the recent modes of investigation is examination of the optic foramina by Roentgen rays.

The optic foramen or canal can readily be demonstrated in a human skull. It is, on the average, 4-9 mm. in length (Whitnall), but it may be 12 mm. (Onodi). The lumen varies in shape, but is practically oval. It runs between the body and the two roots of the lesser wing of the sphenoid. The direction is down and out, making an angle of 38° with the horizontal plane, and 38° with the vertical sagittal plane. Considerable variations in length, lumen, thickness and density of its walls, occur.

The anterior opening is oval in outline and measures 5-6 mm. in longer diameter (Pfeiffer); the central part is circular, with an average diameter of 5·5 mm.; the posterior portion is generally considered to be flattened from above downwards.

Great clinical importance is attached to the variable character of the bony walls, which may be 5-7 mm. thick (Stanculeanu), or exceedingly thin, 2 mm.

Michele Del Duca studied ninety crania. He emphasises the influence of the carotid groove in the body of the sphenoid, as it affects the greater or lesser length of the inferior wall.

Anomalies of the sphenoid bone, and of the skull in general, can affect the optic canal, as for instance, the distance between the two internal and intra-cranial orifices are in relation with the existence of brachiocephaly or dolichocephaly. The position of the ophthalmic artery and its grooves is important.

The canal can be examined in the living subject by radiographical processes. The head has to be arranged carefully in the correct position to allow for the radiations to pass parallel to its length; or the lateral aspect can be seen by another adjustment of the rays, head and plate. One method of taking the film is given by Raymond Pfeiffer.

* Paper read in the Ophthalmic Section at the Annual Meeting of the British Medical Association, Oxford, 1936.

The radiographic image of the optic canal is the resultant of superimposition of the image of the internal and external orifices. The exact size must be calculated from the X-ray plate, allowing for the distance of tube, plate, etc. Its diameters correspond to the smallest diameter of these orifices, and its oval form (horizontal or vertical) or its circular form depends upon the relation of horizontal and vertical axes of external and internal orifices.

The presence of a clino-carotid canal, or of a highly thickened lamina quadrilatera alter the shape and visibility of the image of the canal.

A simplified technique for Roentgenographic examination of the optic canal is given by Camp and Granturco.

Goalwin in 1925 published two articles, viz. :—

" Standardisation of a Roentgen ray tube for the precise Roentgenology of the Optic Canals," and

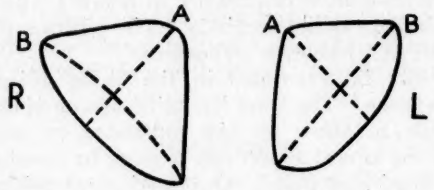
" The precise Roentgenography and measurement of the Optic Canal."

Frimann-Dahl describes " A new projection for the Roentgenology of the Optic Foramen." It is said to be simple, rapid and accurate, requires no special apparatus, and eliminates any special adjustment of the tube.

Considerable variations occur in the normal anatomy, and others where the skull is deformed by hydrocephalus or oxycephaly. A thorough knowledge of these variations is necessary in order to interpret the radiograms of truly pathological conditions.

A very good paper by Goalwin, entitled " One Thousand Optic Canals " was written in 1927. Examination was definitely indicated in 253 cases. In all, 23 pathological conditions of the optic canal were demonstrated in 89 of the 253 cases, equal to 35 per cent. The cause of the visual disturbance was found elsewhere in the skull in 126 cases, equal to 50 per cent.

The optic canal attains full lumen at the age of three years. The shape when radiographed approximates a quadrant of a circle. An absolutely circular section is never found in normal canals.



Two diameters are differentiated, viz., A and B.
A is usually 0·3 mm. less than B.

The average of A is 4·26 mm., and of B 4·49 mm.

The largest normal canals have been observed in cases of tumour of the middle fossa: (R) 4·7 × 7·24 mm. (L) 4·3 × 7 mm.

The largest pathological canal occurred in an optic nerve tumour: the A diameter showed 71 per cent. of increase of measurement, and the B diameter 54 per cent., on the left side, as compared with a normal lumen on the right side.

Only one canal was noted with a diameter of 2·8 mm. without any ophthalmological evidence of optic nerve atrophy. The smallest pathological canal observed had a B diameter of 1·4 mm., due to a hyperostosis.

It is evident that from the clinical point of view the important thing is not the classification of normal foramina, but the recognition of typical shapes associated with various skull deformities and with the various forms of pathological change in the lumen and walls of the canal and adjacent structures.

The conclusions arrived at by Goalwin are as follows:—

1. Discrepancies between sizes and shapes of the canal are due to:—

   (*a*) Measurement made at different points of a conically shaped canal.

   (*b*) Observation from varying angles.

   (*c*) The use of X-ray dimensions without proper deduction.

2. In the series of 253 cases examined for 34 causes, 23 types of pathological change were found in 35 per cent. of cases; in 50 per cent. the cause was found elsewhere in the skull, and in about 7 per cent. the negative diagnosis was of clinical value.

3. Skull deformity with optic nerve symptoms is fully twice as frequent in eye practice as optic nerve tumour.

4. The average shows no appreciable variation depending on sex or racial stock.

The average inclination in normal skulls is 39°, and is the same in the vertical as in the median vertical plane.

5. The average normal canal measures 4·1 by 4·65 mm., with virtually no variation due to age, sex or stock.

6. Absolute symmetry may be expected in 45 per cent. normal skulls; difference of 10 per cent. or less may be expected in about 40 per cent. of normal skulls; and difference of 10 per cent. to 20 per cent. in 14 per cent. of normal skulls.

7. A canal measuring less than 2·8 mm. in one of its diameters cannot contain a normal optic nerve.

8. A classification of normal shapes is not of clinical value because pathological canals present changes in size or structure of their walls, or both.

9. An enlarged circular canal is indicative of optic nerve tumour.

10. Irregularity, erosion or destruction of any wall, or part thereof, is always pathological. Hyperostosis or exostosis is also always pathological.

van der Hoeve states that the first man to take radiograms of the optic canal was Rhese of Königsberg.

van der Hoeve found that enlargement of the optic canal was present in :—

1. Neuro-fibromatosis diffusa of the optic nerve.
2. Glioma of the orbit.
3. Glioma of the chiasma and intra-cranial portions of the optic nerves.
4. Hydrocephalus.

He considered operation justifiable if the optic foramen is compressed by tumours, callus, or haemorrhages; also if the canal is too small. He mentioned methods of operation.

Worms has given indications for, and methods of, surgical interference. He stated that decompressive trephining of the canal is a simple operation, without much risk, holding a worthy place along with older proceedings.

In a paper by Leon E. White, he concludes that pneumatisation about the canal causes distortion and narrowing, thus rendering the optic nerve vulnerable. The size and shape of the canal can be determined by careful radiography. The data, up to the present, indicate that there is a great danger of permanent impairment of vision wherever a severe neuritis occurs in canals abnormally small, while with the same impairment of vision in a normal canal, spontaneous recovery may be expected.

In the chronic conditions, the neuritis is thought to be toxic from some focus, such as teeth or tonsils.

Neuritis, either acute or chronic, in the normal or abnormally large canals, seems to be usually of extra-nasal origin. This, if it proves true, should be of great importance in making a differential diagnosis between intra-cranial, multiple sclerotic, luetic and accessory sinus cases. While it is, of course, possible for any infection to reach the nerve through the circulatory system by bacteriaemia or toxaemia, the writer feels that canals of normal size are not specially vulnerable, and that either local treatment or the removal of some definite focus of infection is the more advisable method, rather than ventilation of the sinuses.

In White's opinion a canal of 4 mm. or less in a case of severe optic nerve involvement indicates the necessity for immediate ventilation of the posterior sinuses to prevent permanent atrophy unless some other definite focus can be found. A 4·5 mm. canal gives greater leisure for study and investigation, for optic atrophy

is less to be feared. A 5 mm. canal would probably recover from almost any acute attack, either spontaneously or under local treatment. Further, if some remote focus of infection is found (diseased teeth or tonsils for instance), it should be removed to prevent recurrence.

H. K. Taylor practically confirms the view that a contracted canal warrants early surgical interference.

Lysholm and Olivecrona state that changes of the canals are described in cases of gliomata of the optic chiasma, supra-sellar cholesteatomata and pituitary adenomata. In gliomata of the chiasma and supra-sellar cholesteatomata the changes consist in the widening of one or both optic canals, and widening of the sulcus chiasmatis, while the sella remains essentially normal. In pituitary adenomata destruction of the walls of the canals, together with the destruction of the sella and the clivus was observed. Their paper is very interesting, and is illustrated by numerous X-ray appearances.

Leon White comes to the following conclusions: Extensive pneumatisation about the canal is usually associated with narrowing. When the lesser wing is more pneumatised the canal is flattened on top. If the region below is pneumatised it becomes oval, rarely triangular. Any irregularity of contour of the optic canal, from whatever cause, produces a diminution in calibre, and renders its contents more susceptible to infections from surrounding sinuses. Incorrect conclusions may be drawn from faulty X-ray films. The image of the canal should always appear in the radiogram in the lower outer quadrant of the orbit. If the canal is large, one must look elsewhere for the causes of amblyopia.

Leon E. White has stated that in a series of X-ray films it was found that patients with optic nerve disturbance had abnormally small canals. By analysing 36 cases of optic nerve involvement, it was found that in the smaller canals the vision in 50 per cent. was permanently impaired, while in patients with larger canals the percentage was much less. In 37 cases of optic atrophy studied, nasal infection was responsible for atrophy in 12 out of 124 optic canals, *i.e.*, 10 per cent.

Raised intra-cranial tension seemed to be responsible for abnormally large canals, as intra-cranial lesions were found in all.

Atrophy of the optic nerve in infancy is not responsible for very small canals. While it is possible to enlarge the canal surgically, cases are rarely seen at the stage when it would be beneficial. Leon White confirmed the view that the chance of permanent loss of vision is markedly increased whenever any process capable of producing atrophy occurs in abnormally small canals. As the foramina approach normal size they rapidly reduce the menace to their neural content although optic atrophy may occur in canals of all sizes.

Goalwin, in a paper entitled "The profile Roentgengram of the Optic Canal," summarises as follows:—

1. A profile X-ray of the optic canal is a view taken at right angles to its axis, in contradistinction to cross section.
2. True profile is not obtainable at same time as true profile of sella turcica.
3. A true profile X-ray is obtained by placing the patient's head on a horizontal plate in a special position.
4. On a typical profile X-ray of the optic canal, the roof, anterior clinoid processes and bridge which separates the canal from the sphenoidal fissure can be identified.
5. Profile view is of value in determining the length and other normal and pathological details, transverse of section, hyperostosis, etc.
6. The peculiar shape of the sella turcica found by Martin and Cushing in tumour of the chiasma and intra-cranial portion of the optic nerve is not due to enlargement of the canal, nor to destruction of bridge between the optic canal and sphenoidal fissure.
7. A long canal is unfavourable in presence of pathology in it, particularly if the section is small.

In another paper Goalwin maintains that the clinical value of radiology of the optic foramina holds in cases of:—

1. Optic neuritis, retrobulbar neuritis, choked disc, optic atrophy, etc.
2. Sphenoidal disease, with or without optic nerve symptoms.
3. Orbital, ocular or optic nerve tumours.
4. Known or suspected fracture of the skull, whether recent or healed.
5. Foreign body in orbit.
6. Skull deformity with visual disturbances.
7. Tumours of anterior and middle fossa.
8. Certain general diseases, like Paget's disease, acromegaly, rickets, etc.
9. Cases of tuberculosis with optic nerve symptoms.
10. Medico-legal cases where loss of sight is alleged to have been caused by injury.

A man aged 25 years, recently under my care at the Manchester Royal Eye Hospital, has optic discs which are extremely pale; the visual acuity is (R) 6/60, as a blotch, J.16, and (L) 6/60, as a blotch, J.16; and he has a large central scotoma for white in each field. The foramina measure (R) 3 mm., and (L) 4 mm. They are the smallest seen so far by Mr. G. Jefferson and myself. The radiogram was taken at the Manchester Royal Infirmary.

In my opinion careful and accurate radiography should be carried out in all cases of affections of the optic nerves. Positive

evidence of variations in the lumen and in the state of the walls of the optic foramina is of considerable help, but negative findings are also of much service in diagnosis and treatment.

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INDUSTRIAL EYE INJURIES AND THEIR PREVENTION

BY

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LONDON

THIS contribution is based on a study of patients who attended the casualty department of the Royal Eye Hospital, St. George's Circus, London. The hospital, situated in a highly industrialized area, is the only eye hospital south of the river. In the year 1935, 10,786 patients attended the casualty department of whom

approximately 6,500 were suffering from industrial eye injuries. In the first six months of 1936, the casualty department of the hospital attended to 5,623 patients; approximately 3,650 were suffering from industrial eye injuries.

All patients attending the casualty department are asked whether their injury was sustained at work, and a note of their statement is made in the hospital notes. Patients are also asked about the type of work they were doing at the time of the accident.

As a result of the latter investigations, one finds that about 50 per cent. of all industrial eye injuries were sustained by the men grinding on emery wheels. This type of work is responsible for the largest number of corneal foreign bodies seen at the hospital.

The following occupations:—(1) working on the lathe, (2) turning, (3) chipping, (4) milling, (5) spinning, (6) boring, (7) hammering, (8) soldering, (9) drilling, (10) chipping boilers, (11) electric welding, account for a further 30 per cent. of the eye injuries. Hammering and chipping caused the greatest number of intra-ocular foreign bodies.

The engineering and metal trades are therefore responsible for about 80 per cent. of all industrial eye injuries. The following trades account for the remaining 20 per cent.:—(1) building, (2) chemical factories, (3) coke making, (4) loading and transport, (5) paper factories and printing factories.

Types of Injuries

Corneal Foreign Bodies.—These form the bulk of industrial eye injuries. In the first six months of 1936, 2,700 patients attended for removal of corneal foreign bodies: Nearly 95 per cent. came from the metal and engineering trades. The patient often knows the time when the foreign body gets into his eye, but frequently he can only vaguely refer to it. Discomfort usually starts 6-12 hours later, after which "latent period" he begins to feel pricking when closing his eye, and in many cases he complains of photophobia when attending the hospital on the morning after the injury is sustained. This "latent period" may extend to several days, the patient coming up for treatment three or even ten days after injury. In many of these cases there is marked keratitis surrounding the corneal foreign body, but the cornea heals and clears surprisingly quickly after removal of a corneal foreign body.

The amount of irritation caused by the metallic foreign body depends in most cases on the degree of corneal rusting present. Iron rusts the cornea very rapidly, and in some patients, seen a

few hours after the accident, a great deal of rusting was already present.

Most corneal foreign bodies following industrial injuries are buried deep in the epithelium, and should be removed with a discission needle. Many of our patients were attended by their doctors and by house surgeons in general hospitals who tried to remove the foreign body with a blunt instrument (a spud) and, after failing to do so, referred them to the Royal Eye Hospital. To remove a corneal foreign body it is essential to cocainize the eye, to have a good light, a loupe and a sharp discission needle.

The ring of rust should be removed in every case, otherwise the eye will remain irritable. A mydriatic is instilled in each case, and a pad and bandage put on. These two facts are especially mentioned, because a great number of patients were seen who were treated at first outside the hospital, and the use of a mydriatic or pad and bandage was omitted.

It has been stated that the cornea gets less sensitive after repeated injuries (multiple corneal foreign bodies) and that this fact explains the late arrival of the patient for treatment. The sensitivity of the cornea of many of these patients was examined, and, in many cases, diminished sensitivity was established, but it was not found to be the rule.

Another observation made was, that the cornea of the younger workman was more sensitive than that of the man in the sixties, and that the diminished sensitivity did not depend on the number of previous corneal injuries. It was also noticed that the younger workman came up for treatment sooner than the older man.

Subtarsal Foreign Bodies.—These were remarkably rare in industrial cases—they were seen only in patients occupied in loading and transport trades. These patients sought advice at once, as the eye got sore immediately after the entry of the subtarsal foreign body.

Corneal Abrasions.—These form the next largest group of industrial eye injuries. In the first six months of 1936, 850 patients were treated in the casualty department suffering from corneal abrasions sustained at work.

Again the bulk came from steel trades.

Intra-ocular Foreign Bodies.—These should be thought of in all cases of industrial eye injuries. If the history of the patient points to a foreign body flying into the eye, a very careful search for the presence of a corneal or scleral wound should be made.

In all cases of doubt an X-ray examination is essential. In 1935, at the Royal Eye Hospital, there were 191 X-ray examinations for intra-ocular foreign bodies.

All patients suffering from an intra-ocular foreign body are admitted to the hospital, and the foreign body, if magnetic, is removed with the giant or hand magnet. In the first six months of 1936, 16 patients were treated for intra-ocular foreign bodies resulting from industrial accidents.

In 1935, 27 patients were admitted suffering from intra-ocular foreign bodies resulting from industrial accidents. Four eyes had to be excised. Thirteen patients developed traumatic cataract. Ten patients were discharged with vision 6/12 or better.

Perforating Eye Injuries.—Corneal and scleral wounds. In 1935, 22 patients were admitted with perforating eye injuries resulting from industrial accidents. Seven eyes had to be excised. Fifteen patients were discharged with vision 6/18 or better. In the first six months of 1936, 14 patients had perforating eye injuries

Chemical Burns.—These are comparatively rare. This may be explained by the fact that there are only a few chemical factories around the hospital. Approximately 50 patients were seen during the first six months of 1936 suffering from chemical burns of the conjunctiva or cornea. The chemicals which commonly caused the injury were, (1) sulphuric acid, (2) ammonia, (3) spirits of salts, (4) oxalic acid, (5) carbolic acid, (6) aniline dyes, (7) ink.

Lime, Concrete and Cement Eye Injuries.—Approximately 20 patients were seen during the first six months of 1936 suffering from burns of the conjunctiva or cornea caused by lime, concrete or cement.

In all cases of chemical burns the eye is thoroughly irrigated with a neutralizing solution or normal saline. The thorough wash-out of the conjunctival sac has been found to be of greater value than the neutralizing of the chemical. In cases of lime burns, 10 per cent. solution of neutral ammonium tartrate is used for irrigation, 15 per cent. solution of glucose is used in other eye hospitals.

Electric Welding Conjunctivitis (Photophthalmia).—There were approximately 30 cases of electric welding conjunctivitis in the first six months of 1936. In nearly all cases the patients either omitted to use the goggles provided or kept putting their heads at the side of the protective screen.

These patients develop symptoms about six or eight hours afterwards, and come up in many cases to the hospital in the very early hours of the morning complaining of pain, burning of their eyes and photophobia. They have a marked conjunctival injection, and in some cases show ciliary injection and superficial corneal staining. The best treatment for them is instillation of paroleine

and covering their eyes with a pad and bandage for 24 hours. Most of them clear up after one or two days.

Some patients are constantly engaged in electric welding, and they come up to the hospital on many occasions with acute conjunctivitis following exposure to the arc, and in many cases a condition of chronic conjunctivitis develops.

Complications.—All patients seen in the casualty department are asked to report on the following day in the out-patients' department. Corneal abrasions and burns caused in metal and engineering trades heal very rapidly. It is most gratifying to see a cornea, which stained 24 hours previously over ½ of its area, looking perfectly normal, and the eye presenting only a little ciliary injection.

Abrasions caused by wood, paper, concrete or cement are usually a source of greater trouble; infection may follow, and corneal ulceration, hypopyon ulcer and iridocyclitis develop in some of these patients.

Lime and chemical burns cause a good deal of corneal staining and the eye to remain irritable for several days.

Patients who had corneal foreign bodies are carefully examined on the following day for the presence of any rust remains. If rust was left, its removal is essential. A mydriatic and a pad and bandage are ordered as long as staining of the cornea continues. These simple facts are stressed because they are so often neglected by practitioners who are not used to treatment of eye injuries.

The vast majority of patients are left with no corneal scars, but there is still a great number whose convalescence after a corneal abrasion or removal of a foreign body is protracted, and superficial corneal scarring follows. The degree of scarring depends on the depth of the corneal foreign body, and the amount of rusting associated with it. Some patients have old central scarring which has reduced their vision to 6/24 or 6/18.

It is striking to note that a number of patients have attended the hospital during the last 4 or 5 years for removal of 24 or more corneal foreign bodies.

As a result of enquiries as to absence from work, it was ascertained that the majority of patients stayed away from work for a whole day, others for two, three, seven or more days. It was noticed that, if the cornea did not heal up within three days, the absence of the patients from work extended to a week or longer.

The extent of serious complications following industrial eye injuries can be gauged by the number of admissions of these patients to the hospital. In 1935, 70 patients were treated as in-patients suffering from industrial eye injuries. Approximately 40 were sent for treatment as in-patients to L.C.C. hospitals in view

of the shortage of beds at the Royal Eye Hospital. The total number of in-patients at the Hospital in 1935 was 968.

In the first six months of 1936, 37 patients were treated as in-patients following industrial injuries, 27 patients were sent for treatment to L.C.C. hospitals. The total number of in-patients for the first six months of 1936 was 455.

The industrial cases therefore represent over 10 per cent. of all in-patients of the hospital. The admissions in 1935 were, as already stated above, 27 patients with intra-ocular foreign bodies, 22 with perforating eye injuries, the other 61 patients were suffering from severe cuts of the cornea, infected abrasions, hypopyon ulcers, iridocyclitis, burns or chemical burns. One patient developed sympathetic ophthalmitis.

This report does not pretend to give a general survey of industrial eye injuries. It simply deals with injuries as seen at a London hospital serving a large industrial area of London, and it can be taken as representing the type of industrial eye injuries met with in the London area.

The Extent of Industrial Eye Injuries

The annual report of the Chief Inspector of Factories and Workshops for the year 1934, published by His Majesty's Stationery Office, gives the following figures: Total non-fatal accidents in 1934, 136,073; total eye injuries, 5,950. The annual report only refers to accidents which disabled the workman for more than three days from earning full wages for the work at which he was employed. The total 5,950 for 1934 only represents an extremely small number of the multitude of industrial eye injuries in this country per annum. The bulk of eye injuries cause the workman to lose his wages for one, two or three days, and would thus not be reported in the Chief Inspector of Factories' report.

The economic loss to the workmen and the country is tremendous, and its extent can only be gathered from a hospital report as given above, which conveys a true impression of the numbers of industrial eye injuries in a certain industrial area.

American insurance statistics[1] show that in terms of workmen's compensation the eye hazards of industry are more serious than any other group of accident hazards with the single exception of those resulting in death. More money is paid by employers each year in compensation for eye injuries than is paid for injuries to any other part of the body. Lewis H. Carris[2] writes that the employers of New York State are on the whole as progressive as any in America in the matter of accident prevention; nevertheless, an

analysis of eye injuries during the last six years prepared for the National Society for the Prevention of Blindness by Dr. E. B. Patten of the New York State Department of Labour shows a more or less steady increase in the number of permanent total disability and permanent partial disability cases from 2,247 in 1925 to 3,200 in 1930.

In this country, the annual report for 1930 shows that there were 6,256 eye injuries out of a total of 144,758 industrial accidents; in 1931 there were 4,807 eye injuries out fo a total of 113,249; in 1932 there were 4,433 eye injuries out of a total of 105,562; in 1933 there were 4,540 eye injuries out of a total of 112,512. The year 1934 shows an increase in the incidence of eye injuries.

The Departmental Committee on the Causes and Prevention of Blindness set up by the Ministry of Health gave in its report in 1922 most instructive figures for this country. Mr. McBride, of the Commercial Union Assurance Company, gave the Committee statistics of claims made on accident insurance companies.

The statistics relate to 111,000 claims, of which 2,585, or 2·33 per cent. were in respect of eye accidents.

Investigation was made by the Committee of records of eye accidents at hospitals in London, Manchester, Newcastle, Glasgow and Edinburgh. Out of 3,700 records examined of in-patient eye accidents, 2,336 were recorded as industrial accidents.

These two sets of statistics indicate in how large a number of occupations eye accidents occur, and point out that the greatest quantity of accidents occurs in mines and quarries and the large group of industries forming the metal and engineering trades.

The report also gave the figures of blindness as furnished by the Scottish Board of Health, showing that, on the Scottish Register of the Blind in 1922, there were 5,515 blind persons, 426, or 7·2 per cent. of whom were blind as a result of industrial eye injuries. The figures for England and Wales were not available for the Committee. The American figures[1] show that 15 per cent. of the blind of America lost their sight following industrial injuries. The American insurance and blindness figures are easily obtainable. In this country, insurance figures are treated as a confidential matter, and I could not obtain any information in answer to my enquiries.

The records of the State Department of Labour and Industry of Pennsylvania[2] show that, in 1927, 288 eyes were lost, in 1929, 565 eyes were lost and in 1930, 520 eyes were lost as a result of industrial eye injuries. The amount of compensation paid out for these and other serious eye injuries was one million dollars per annum.

Prevention of Eye Injuries

A recent analysis of circumstances surrounding 70,000 accidents has led Heinrich, of the Travellers' Insurance Company, to the conclusion that 98 per cent. of all industrial accidents are preventable, and of these 88 per cent. could be prevented by proper supervision and administration. These findings are corroborated by practical results achieved in large industrial undertakings in this country where great efforts are made in the prevention of industrial injuries.

The present high numbers are due to (1) non-provision of safety measures by employers and (2) the attitude of indifference shown by workmen to the risks entailed in their work, and their negligence in using preventive measures supplied to them.

The Committee on the Causes and Prevention of Blindness in 1922 recommended that all possible steps should be taken to encourage the Development of Works and Safety Committees with regard to the prevention of accidents, the use of safety devices and methods of propaganda, among which, questions relating to the eyes would have their place. The Home Office, in its annual report, 1934, tells about the establishment of Safety Committees all over the country, and the fine record achived by safety organisations: for instance, at the Great Western Railway works, the wearing of goggles is made compulsory in certain operations such as, chipping, cutting of bolts, and processes of a similar nature. In other operations, where there is any risk of injury to the eyes, the members of the staff are encouraged to wear goggles. The chief engineer of the works at Swindon gives me permission to state that in the whole of his department during 1935, only two eye injuries were recorded in cases where goggles were being worn and, in one of these instances, the man concerned was absent from duty for one day only.

As a result of inquiries of workmen attending the Royal Eye Hospital, one can state that a multitude of firms, especially small firms, have, unfortunately, no safety organisations.

Safety devices have increased very rapidly since 1922. They can be divided into two types. (1) Goggles, masks, veils, eye-screens. (2) Screens and guards attached to machines.

The Home Office Industrial Museum, Horseferry Road, Westminster, has a most complete exhibition of preventive measures used in industry to safeguard the eyes in various operations. With the Chief Inspector of Factories' kind permission, some safety devices exhibited in the Museum are described.

The first stand shows different types of protective measures used by workmen in various trades.

(1) Goggles for acetylene and electro-welders. These are fitted with dark lenses of various shades depending on the type of welding done and amperage used

(2) Goggles for men engaged in lime works as used by the Associated Portland Cement Manufacturers.

(3) A mask worn by rollermen in steel works. This mask protects the eyes and face from pieces of hot scale, and is used by Port Talbot Steel Works, Glamorganshire.

(4) Goggles to protect the eyes from fumes of gas.

(5) A fine silk veil to be used in metal trades as a protection against fine metallic chips.

(6) Goggles made of fine wire gauze used for protection against heavy chips of flying material; also used by persons at chipping paint from metal work on bridges.

(7) Unbreakable goggles for use by workers in the iron trades. The large glasses provide a wide field of vision. This type is encouraged by the Iron Trades Employers' Insurance Association.

(8) An eye screen designed to meet objections raised to the use of goggles. " The screen is very light and comfortable to the wearer. It offers very little restriction to the field of vision. The material ' Bentine ' is non-inflammable, and will withstand a blow of some severity."

(9) Many other types of goggles for protection in glass and electric bulb works, etc.

The use of screens on machines forms the subject of the other stand of exhibits. Here are photographs showing (1) the use of screens for brass working machines. " In the machining of brass articles the cutting is done at a fairly high speed, and the chips of metal which are often quite hot are projected from the tool with some violence. The use of a screen between the tools and the operator prevents eye injuries and small burns on the operator's hands and arms." (2) A photograph of grindstones provided with a celluloid screen.

The use of such screens on emery wheels would prevent a great number of eye injuries; they are especially suitable for works where occasional grinding of tools is done by the workmen. The use of goggles is always neglected, and the screen acts as a very efficient protection against small flying particles of emery or steel.

Such screens are used at the London Passenger Transport works, and they have greatly diminished the incidence of eye injuries.

There is also shown a model of a grindstone fitted with a triplex screen. This " clearview " grinding wheel guard offers complete protection and renders the use of goggles unnecessary. Its cost is

not high, and it can be fitted to any convenient position on the grinder head.

All those safety measures shown at the Museum are actually in use in a number of industrial establishments all over the country. The goggles shown in the Museum have overcome the usual complaints brought by the workmen against their use. (1) They can be fitted comfortably. (2) They are light. (3) They do not impede vision. (4) They can be used with an " anti-dimming " compound which prevents condensation of moisture on the lenses.

The workmen are most reluctant to wear goggles, and even those who have had several corneal injuries will not put their goggles on while grinding or turning, and it will require a great deal of propaganda work on the part of safety organisations to break the old prejudices and habits of the workmen. In the United States of America some accident insurance companies make a reduction in premium to those employers in whose works safety committees have been put into operation. The Committee for Prevention of Blindness (1922) recommended that similar facilities should be given by insurance companies in this country.

This recommendation of the committee is still just as urgent as it was 14 years ago when the Committee published its report. The problem is too wide to be tackled by individual employers and local safety committees.

If the insurance companies will join in the excellent work done by some employers of labour and many safety organisations all over the country, we will achieve a diminution of eye injuries and, with it, of its resultant total or partial blindness.

I wish to thank all the members of the staff of the Royal Eye Hospital for their kind permission to publish the casualty and in-patient figures of the hospital, and also for their help and advice in preparing this report. I must also acknowledge my gratitude to Dr. J. Bridge, Senior Medical Inspector of Factories of the Home Office, for the kind assistance he has lent me. Also to all the members of the administrative and nursing staff of the Royal Eye Hospital who helped me to collect the figures of patients given in this report.

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A NEW EYE SHIELD FOR USE IN INDUSTRY

BY

C. G. KAY SHARP

LEEDS

MINING is one of the principal causes of industrial blindness. There is not, at present, any device which is completely satisfactory as a protection against flying pieces of coal or stone.

The factors which a miners' eye shield must embody, are:—

1. *No diminution of illumination.*
2. *Free ventilation in front of face.*
3. *In use or out of use without removal.*
4. *Strength*—a fragile apparatus would be useless to a man using a pick and shovel.
5. *Light weight.*
6. *Ease with which it can be put on and off.*

These factors are embodied in a device which has been made for me by Safety Products, Ltd., 44, Hatton Garden, London, E.C.1. It consists of a flexible fibre head-band, with a sliding adjustment at back, so that it can be made to fit any head by slight pressure at the sides.

On the front of the head-band is a metal plate to which is fitted a metal projection carrying a double ball and socket joint. At the distal end of the ball and socket joint is an oblong metal frame, carrying the protective material—laminated glass, in the case of miners' protector, and mica or gauze in the case of other trades. The shield, without the head-band, can be fitted to a miners' helmet.

The advantage of the shield being carried on a ball and socket joint, is the ease with which the protector can be placed in any required position, or turned back over the head when not required. In addition, the protector is carried well away from the face, allowing free ventilation.

The fibre head-band, with the sliding adjustment, is strong, light, and can be fitted to any head with a minimum of trouble. When fitted, it can be put on and off with the ease of putting on and off a hat. When not in use, the sliding adjustment allows of considerable reduction in size, for carrying in pocket, etc.

SULPHUR METABOLISM IN SENILE CATARACT

BY

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and

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BIRMINGHAM

THE supposition that human senile cataract might be associated with some disorder of sulphur metabolism was based upon two facts. First, sulphur containing compounds such as cystine and glutathione, which are believed to play an important rôle in normal lens metabolism, are known to disappear from the lens during the development of cataract. Second, there is some evidence that the experimental cataract akin to the human senile type which can be readily produced in rabbits by the administration of naphthalene, may be due to the withdrawal of cystine from the body as a whole and consequently from the lens. For it has been shown that naphthalene is detoxicated in the body of the rabbit by conjugation with cystine and that it is excreted as α-naphthyl mercapturic acid (Bourne and Young, 1934); while Nakashima (1934) has made the converse observation that if extra cystine were given the toxicity of naphthalene was reduced and the lens lesions were prevented. These findings suggest a relationship between cystine deficiency and cataract formation; and it seemed reasonable to suppose that in senile patients some defect of sulphur metabolism might create a deficiency of sulphydryl compounds in the lens, thus initiating the cycle of degenerative changes culminating in mature cataract; or, alternatively, that some toxic substance, resulting from metabolic failure or tissue breakdown peculiar to old age, might by requiring cystine for its detoxication divert this substance from the lens.

As a means of testing this hypothesis it was decided to investigate the distribution of urinary sulphur in cataractous patients. Normally, sulphur is ingested by human beings chiefly in the form of sulphur-containing proteins, very little inorganic sulphate being present in the common foodstuffs. The metabolism of sulphur is almost wholly the metabolism of cystine, methione, and related compounds derived from protein digestion. The bulk of such sulphur is oxidized in the body and excreted in the urine as *inorganic sulphate*; a small fraction is used for the detoxication of substances such as indole and skatole which are

excreted in the urine as *ethereal sulphates*. Organic sulphur compounds present in the urine are grouped together in what is called the "*neutral sulphur*" fraction; they are believed to arise from the breakdown of body tissues and to represent endogenous sulphur metabolism. Normally, therefore, the amount of neutral sulphur remains relatively constant while the inorganic sulphate varies with the protein intake. Ethereal sulphate excretion depends upon the amount of toxic substance absorbed.

The distribution of the total sulphur of the urine among the three fractions, *inorganic sulphate, ethereal sulphate,* and *neutral sulphur,* may be taken as an index to the sulphur metabolism of the body. In the case of patients with senile cataract it was expected that any failure of the normal mechanism for the oxidation of ingested protein sulphur would be revealed by a diminution in the inorganic sulphate and a corresponding rise in the neutral sulphur (organic) fraction; while, if the cataract were due to a toxic process, a rise in the ethereal sulphate or neutral sulphur fractions would be observed.

Experimental

The plan of experiment was to estimate the three urinary sulphur fractions in a group of patients with senile cataract and in a control group over a period of several days. The numerous practical difficulties involved in this type of experiment as applied to hospital patients are obvious. In order to minimise them it was decided to investigate cataractous and control cases simultaneously and under identical conditions, and to base all conclusions on a comparison of the results obtained from these two groups. Five patients with senile cataract and six control cases were studied. All were patients in the wards of the Birmingham and Midland Eye Hospital, the controls being selected from among those patients with ocular conditions such as retinal detachment, squint, etc., in which the lens was not affected. In no case was there any evidence of albuminuria. The diet of each subject was controlled as rigidly as possible, chiefly with a view to standardizing the protein and sulphur intake, and also in the hope that, if any abnormality of sulphur metabolism were present, it would be more sharply defined by contrasting the effect of high and low protein diets. Just over 2,000 calories per day were allowed, the patients being in a resting condition, *i.e.*, either in bed or sitting quietly throughout. Each diet was continued for three or four successive days, and the urine was collected in 24-hour periods. Details of the diets are given in Table I.

TABLE I

SCHEDULE OF DIETS (Daily Allowance).

Food	Normal 2261 calories			High Protein 2325 calories			Low Protein 2328 calories		
	oz.	Protein gm.	Sulphur gm.	oz.	Protein gm.	Sulphur gm.	oz.	Protein gm.	Sulphur gm.
Bread	8	20·61	0·227	7½	19·40	0·206	8	20·61	0·227
Butter	2¼	0·63	0·006	¾	0·21	0 002	3½	0·84	0 008
Egg	2	7·50	0·109	2	7·50	0·109	—	—	—
Cheese	1	7·73	0·071	2½	19·39	0·184	—	—	—
Beef	4	21·17	1·283	4	21·17	1·283	—	—	—
Potato	4	2·24	0·033	—	—	—	4	2·24	0·033
Cabbage	4	1·78	0·066	—	—	—	—	—	—
Apples	8	0·89	0·013	—	—	—	8	0·89	0·013
Sugar	1⅓	—	—	1½	—	—	2⅔	—	—
Cream	1	0·70	0·008	—	—	—	1	0·70	0·008
Marmalade	1	0·16	—	—	—	—	2	0·32	—
Milk	5	4·62	0·047	15	13·80	1·39	4	3·69	0·37
Oatmeal	—	—	—	2	9·02	0·123	—	—	—
Ham	—	—	—	2	11·08	0·642	—	—	—
Beans	—	—	—	3	5·85	0·048	—	—	—
Cauliflower	—	—	—	—	—	—	6	3·03	0·110
Banana	—	—	—	—	—	—	2½	0·91	0·097
Total		68·03	1·863		107·42	3·987		33·23	0·866

(Figures taken from Sherman, 1933.)

Inorganic sulphate, ethereal sulphate, and total sulphur were estimated gravimetrically on the 24-hour urine specimen by the method of Folin (1905). The gravimetric method, although tedious, was found to be the most accurate method available for the determination of urinary sulphates. Denis's (1910) reagent was used for oxidation in the total sulphur estimations. The amount of sulphur present in the neutral sulphur fraction was obtained by subtracting the combined inorganic and ethereal sulphur from the total sulphur.

Results

In Table II are collected the results from two groups of patients on normal protein diet. Each patient received the diet for three or four successive days, the analytical results for the first 24-hour specimen are omitted from the table. As the figures show, there is no striking difference to be observed between the cataractous and control groups.

TABLE II

Distribution of Urinary Sulphur in Patients with Senile Cataract and in Control Cases.

(Normal Diet: Protein, 68 gm.; Sulphur, 1·8 gm.; Calories, 2340.)

Subject	Age	Sex	Day of Diet	gms. Sulphur excreted in 24 hours as				Per cent. of Total Sulphur excreted as		
				Total Sulphur	Inorganic Sulphate	Ethereal Sulphate	Neutral Sulphur	Inorganic Sulphate	Ethereal Sulphate	Neutral Sulphur
				CONTROL CASES						
L. H. -	33	♂	2nd	0·363	0·270	0·020	0·073	74	6	20
			3rd	0·520	0·401	0·032	0·087	77	6	17
V. W. -	40	♀	2nd	0·552	0·425	0·40	0·087	77	8	15
			3rd	0·382	0·274	0·037	0·071	72	10	18
			4th	0·652	0·451	0·040	0·161	69	6	25
I. N. -	50	♂	2nd	0·616	0·489	0·039	0·088	80	6	14
			3rd	0·224	0·154	0·015	0·055	69	7	24
			4th	0·457	0·335	0·029	0·093	74	6	20
J. J. -	59	♀	2nd	0·448	0·333	0·037	0·078	75	8	17
			3rd	0·441	0·347	0·034	0·060	79	8	13
			4th	0·344	0·258	0·021	0·065	75	6	19
				SENILE CATARACT						
G. H. -	63	♀	2nd	0·585	0·466	0·042	0·077	80	7	13
			3rd	0·578	0·412	0·026	0·140	71	5	24
			4th	0 671	0·474	0·037	0·160	70	6	24
J. B. -	65	♂	2nd	0·996	0·821	0·041	0·134	82	4	14
			3rd	0·421	0·332	0·024	0·065	79	6	15
E. J. -	68	♀	2nd	1·028	0·870	0·079	0·079	84	8	8
			3rd	0·770	0·632	0·073	0·065	82	10	8
			4th	0·820	0·645	0·033	0·142	79	4	17

In Table III the effect of varying the protein and hence the sulphur content of the diet is shown. Each diet was given for three successive days; the analytical figures for the last two day's specimen only are given in the table. Again the results obtained from the cataractous patients are similar to those of the control group.

Discussion

The results of this investigation do not reveal any difference in the urinary sulphur distribution in the cataractous patients as compared with the control cases. Although the individual variations are great, the results are in all cases similar, and in general follow the classical distribution of urinary sulphur first described by Folin (1905). That is, the largest fraction of the total sulphur is excreted as inorganic sulphate which varies with the amount

TABLE III

Distribution of Urinary Sulphur in Patients with Senile Cataract and in Control Cases on Diets of Varying Protein Content.

Subject	Age	Sex	Diet	gms. Sulphur excreted in 24 hours as				Per cent. of Total Sulphur excreted		
				Total Sulphur	Inorganic Sulphate	Ethereal Sulphate	Neutral Sulphur	Inorganic Sulphate	Ethereal Sulphate	Neutral Sulphur
					CONTROL CASES					
J. M.	38	♂	low protein	0·494	0·316	0·046	0·132	64	9	27
				0·480	0·276	0·043	0·161	58	9	33
			normal protein	1·122	0·880	0·085	0·157	79	7	14
				0·455	0·376	0·016	0·063	83	3	14
			high protein	1·390	1·165	0·076	0·149	84	5	11
				0·980	0·718	0·073	0·127	78	8	14
E. N.	28	♀	low protein	0·372	0·227	0·062	0·083	61	17	22
				0·495	0·336	0·046	0·113	68	9	23
			normal protein	0·626	0·447	0·051	0·128	72	8	20
				0·699	0·510	0·043	0·146	73	6	21
			high protein	0·646	0·456	0·041	0·149	71	6	23
				0·746	0·563	0·045	0·138	75	6	19
					SENILE CATARACT					
D. DT.	73	♂	low protein	0·341	0·243	0·034	0·064	71	10	19
				0·289	0·172	0·049	0·068	60	17	23
			high protein	0·621	0·468	0·028	0·125	75	5	20
				0·910	0·695	0·031	0·184	76	4	20
G. S.	68	♂	low protein	0·641	0·450	0·028	0·163	70	4	26
				0·233	0·138	0·009	0·086	59	4	37
			normal protein	0·424	0·290	0·028	0·106	68	7	25
				0·454	0·324	0·019	0·093	75	4	21
			high protein	0·734	0·532	0·048	0·154	73	6	21

of protein ingested; while the ethereal sulphate and neutral sulphur fractions remain more or less constant and independent of the total sulphur excretion. In none of the patients with senile cataract is any deviation from the normal to be observed in the behaviour of any fraction. Therefore the results lend no support to the hypothesis that a disorder of sulphur metabolism might be the basis of the pathological changes in the lens in senile cataract; but the experiments are not sufficiently extensive or conclusive to rule out the suggestion completely. A detailed study of the neutral sulphur fraction, the composition of which even in normal individuals is not completely understood, might show the presence of some specific compound associated with senile cataract. The fact that no increased excretion of ethereal

sulphates was found in any of the cataractous patients in our series makes it unlikely that senile cataract is due to a toxic process. Blood glutathione estimations were done on a number of these patients; the results, which have already been published (Campbell, 1936), showed a normal blood glutathione in every case.

We are indebted to the Birmingham and Midland Eye Hospital, Birmingham, for the opportunity of carrying out these experiments and for a grant covering most of the expenses. One of us (M.C.B.) is also indebted to the Medical Research Council for a grant for expenses. We wish to thank Professor J. C. Drummond for allowing the analytical work to be carried out in the Biochemistry Department at University College, London.

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ABSTRACTS

MISCELLANEOUS

(1) **McKee, S. Handford (Montreal).—A syphilitic ulcer of the eyelid.** *Canadian Med. Assoc., Jl.*, September, 1936.

(1) **McKee's** patient was a man aged 40 years who had been treated for syphilis in 1925. Symptoms had been present for three weeks beginning as a pimple in the lower lid. On examination an ulcerative process involving the outer ⅔rds of the lid on its margin was found. A good deal of destruction had taken place. The condition was diagnosed as a gumma and appropriate treatment brought about rapid improvement.

Photographs of the lid on admission and after a fortnight's treatment are appended.

R. R. J.

(2) **Kalt, M. M. (Paris).—Bilateral orbital tumour with double exophthalmos cured by mercurial treatment. (Tumeur orbitaire bilatêrale avec double exophtalmic guerie par un traitement mercurial).** *Arch. d'Ophtal.*, Vol. LII, p. 656, 1935.

(2) **Kalt** reports an interesting case of a male aged 35 years, a brick labourer who had suffered from bilateral exophthalmos for

2 months. The patient had noted the presence of a small indolent swelling in the region of the lacrymal gland of each orbit at the beginning of his trouble. The Wassermann reaction of the blood was negative, radiographs of the orbits afforded no diagnostic assistance and there was no clinical evidence of local tenderness suggesting a site of periostitis. The exophthalmos was irreducible and the eyes were immobile, the left eye being divergent. Lagophthalmic keratitis was evident in both eyes.

A biopsy was performed and the tissue removed proved to be composed of those cells which make up a chronic granuloma. After 6 intravenous injections of mercury cyanure the exophthalmos began to diminish and after 24 injections of this substance the newly formed masses of cells in the orbits disappeared, the exophthalmos went and ocular mobility was restored.

The author comments on the necessity for prolonged and persistent mercurial treatment in such cases. In this case he made the diagnosis of orbital syphiloma by a process of excluding tuberculous disease, mycosis, intra-nasal infections and other inflammatory disorders.

H. B. STALLARD.

(3) **Dunnington, John H. and Khorazo, Devorah (New York).—Conjunctivitis due to fusospirochetal infection.** *Arch. of Ophthal.*, August, 1936.

(3) The condition of fuso-spirochaetal infection of the conjunctiva is rare and **Dunnington** and **Khorazo** have found only five cases in the literature. In four of these, the conjunctivitis was unilateral, clearing up without any involvement of the cornea, but in one it was bilateral and involved both corneae producing dense leucomata. In two cases the infection could be traced to a stomatitis caused by the same organism, in one to infection from the saliva of a patient with a dental fistula in the other two cases the infection was primary, no focus of origin being found. The authors' patient was a girl aged 20 years, who had had conjunctivitis in the right eye for two weeks. There was a purulent discharge with congestion. Films of secretion stained with gentian violet showed a number of fusiform bacilli and occasional spirochaetes. The bacilli were obtained in almost pure culture when grown anaerobically on a medium consisting of chopped meat broth and ascitic fluid. Treatment with a lotion of 1 per cent. sodium perborate and weekly applications of copper sulphate resulted in cure.

F. A. W-N.

(4) Freiberger, Moses (New York).—Corneal dystrophy in three generations. *Arch. of Ophthal.*, August, 1936.

(4) Freiberger's article opens with a comprehensive review of the literature on this subject, starting with Groenouw's original description and quoting some 40 references. He then describes seven cases of his own. Several theories have been advanced with regard to the aetiology of the disease. Fuchs considered it to be nutritional in origin, Collins, neuropathic, Wehrli and Green, tuberculous, Roy, as a consequence of consanguinity. The author in his seven cases was unable to verify any of these theories and could find no treatment which was of any avail. Pathologically the nodules consist of a hyaline substance developing in the superficial lamellae of the cornea in which crystals of phosphate and sodium urate are subsequently deposited. From the clinical standpoint, the disease is first manifest at or about puberty and appears as very fine streaks in the cornea running in a vertical direction. Under the slit-lamp these streaks can be seen to be made up of minute dots covering approximately the pupillary area of the cornea in its superficial layers. In the course of time the dots become aggregated into larger masses and produce discrete greyish nodules lying for the most part deep to Bowman's membrane and producing some irregularity in the surface of the corneal epithelium. The cornea becomes gradually more opaque and visual acuity correspondingly less. The disease is inherited as a dominant trait, occurs in about an equal proportion of males and females and may be transmitted by either parent.

F. A. W-N.

(5) Fiore (Naples).—Optochin and its derivatives; their action on the metabolism of the pneumococcus. (Azione dell'optochina della fluoresceina e del fluoresceinato di optichina sul metabolismo del pneumococco). *Boll. d'Ocul.*, June, 1936.

(5) The respiratory action of the pneumococcus is characterised by the fact that it produces peroxide of hydrogen which accumulates in the culture, because there is no katalysis. It has been found that optochin has a specific toxic action on the pneumococcus. In concentration of 1 in 1,000 it inhibits the production of H_2O_2 practically completely. Since it has been shown that the virulence of the bacteria varies with their production of H_2O_2 may be presumed that the toxic action of the alkaloid on the bacteria is due to the inhibition of the process of dehydrogenation.

The fluoresceinate of optochin is even more active than optochin, and this action is increased by exposure to light. Fio e has carried out experiments *in vitro* which show these facts clearly.

HAROLD GRIMSDALE.

(6) **Marshall, Don (Ann Arbor, Michigan).—Changes in refraction following operation for strabismus.** *Arch. of Ophthal.*, June, 1936.

(6) Marshall gives an interesting account of the refractive changes observed in a group of 55 patients in whom a total of 62 operations had been performed for squint. Refraction was carried out under adequate cycloplegia, the ages of the patients being from 5 to 31 years, averaging 12·3 years. The examinations were made 4 days before and 14 days after operation. In a fair proportion of cases, second and third examinations were made at intervals of 6 months and a year after operation. The general findings were as follow:—

60 per cent. of the patients showed a change of 0·50 D. or more in at least one meridian of the operated eye when discharged from hospital, the average change being 0·75 D. In 41 per cent. of cases the untouched eye showed a significant change. The later examinations showed a tendency for each eye to return slowly to its pre-operative condition but there was usually some slight permanent change.

F. A. W-N.

(7) **Palmieri (Padua).—The treatment of glaucoma by intravenous injections of hypertonic solution of sodium chloride. (Influenza delle iniezioni endovenose di soluzione ipertonica di chloruro di sodio sulla tensione endoculare).** *Ann. di Ottal.*, April, 1936.

(7) According to the best authorities, says Palmieri, the intra-ocular pressure may be considered as being expressed mathematically as follows:—The blood pressure in the eye—the osmotic pressure of the crystallines in the blood—the oncotic pressure of the blood is equal to the intra-ocular pressure—the osmotic pressure of the crystallines in the aqueous—the oncotic pressure in the aqueous, and since the osmotic pressure of the crystallines of the blood equals that of the crystallines of the aqueous, and further from the minimal colloid content of the aqueous, its oncotic pressure may be taken as zero, we have the result that the intra-ocular pressure equals the blood pressure in the eye—the oncotic pressure of the blood.

But there must be a regulating mechanism to govern these various pressures, the nature of which is not as yet understood. In the experiments which form the base of the paper, the author injected 5 c.c. of 30 per cent. solution of NaCl intravenously in a number of patients suffering from glaucoma in various forms. He has found constant lowering of pressure, greatest in acute and secondary glaucoma, less in the chronic form and, in the case of

patients showing glaucoma in one eye only, nil in the normal eye. The pressure remained low for a variable time, usually for two or three days; sometimes the fall was of short duration, less than 24 hours. In all cases there was relief of pain and the corneal oedema was less. There was often thirst which was not severe; sometimes there was an increase of urine, but often it was slight only. The author regards this method of treatment as of temporary value, especially in the acute forms; in these the reduction of pressure makes surgical intervention safer. In other cases where operation is thought inadvisable, the temporary reduction gives better chance to the action of miotics.

HAROLD GRIMSDALE.

(8) **Baratta (Parma). — Ocular lesions from lightning. (Sulle lesioni oculari da folgorazione).** *Ann. di Ottal.*, May, 1936.

(8) **Barrata** describes three cases of injury by lightning; in two of these there was bilateral cataract which developed some months after the accident. In the third case a boy of 14 years of age was struck indoors, and was unconscious for an hour being revived by artificial respiration. He noticed pain in the left eye and diminution of visual acuity. The left pupil was contracted and oval; it was made a little larger by atropine. There were some superficial striae in the lens. Vision in the left eye was 6/10. Two months later L.V. 10/10.

The small pupil which did not dilate to atropine made accurate examination of the lens difficult; the author thought at the first examination that there were changes in the posterior part of the lens also. He thinks that the improvement in acuity was due to regression of these, as the striae in the front of the lens remained unaltered.

The left pupil remained contracted and oval; the vertical diameter 3·5 mm., the horizontal 3·0 mm. The right pupil was round and about 6·5 mm. in diameter. The author thinks this miosis due to paralysis of the sympathetic, since, though inactive to mydriatics, it was easily affected by eserine.

HAROLD GRIMSDALE.

(9) **Bouman, K. H. (Amsterdam).—On so-called "Spontaneous Arachnoid Haemorrhages."** *Edin. Med. Jl.*, October, 1936.

(9) **Bouman,** Professor of Psychiatry in the University of Amsterdam, read this paper at the combined meeting of the Neurological Section of the Royal Society of Medicine and the Amsterdam Neurological Society, at Amsterdam in May of this year.

The basis of the paper is an account of a typical spontaneous subarachnoid haemorrhage in a woman of 40 years of age. She

was suddenly seized with severe headache and fell on the floor. Headache persisted accompanied by persistent vomiting. When admitted to the clinic meningeal irritation was obviously present. There were retinal haemorrhages in the left eye. The cerebro-spinal fluid showed a yellowish, bloodstained fluid with xanthochromia on standing.

The clinical picture hardly varied during the next few days, headache improved slightly but the patient had occasional attacks of vomiting. The xanthochromic cerebro-spinal fluid improved, but leucocytes and lymphocytes were present. After the patient had been confined to bed for four weeks a paralysis of the third cranial nerve set in suddenly. This was still present when the paper was read.

The author next describes shortly a case with a similar history which ended fatally. Necropsy showed an aneurysm of one of the vessels of the Circle of Willis, the left arteria communicans posterior. More detailed examination showed a congenital abnormality of the Circle of Willis. The connexion between the basilar artery and the arteria communicans posterior was a small thin vessel out of all proportion to the usual size.

The author concludes that in cases of such an anomaly " the condition of the blood-currents in the Circle of Willis have completely changed and that the normal static and dynamic conditions are greatly disturbed.

The first result must be a much greater pressure in some of the smaller vessels, which vessels cannot in the long run resist this pressure. If the normal communication between the basilar artery and the arteria cerebri posterior is blocked (or almost blocked) on one side, the whole current is led through the arteria communicans posterior on the other side. But this relatively small vessel is also subjected to the high pressure of the carotis interna. The effect can only be this: that two mighty currents of the blood-circulation meet together in this small vessel, originally not built to resist these currents. Moreover—and this seems to be very important—this particular vessel is subjected to the entirely opposed currents of the carotis interna and the basilar artery. As soon as the wall is weakened by the perpetual currents an aneurysm may easily be formed in the long run and increased by whirlpools made by these directly opposed currents. Hence the ' supposed weakness ' of the vessel-wall.

There can be only one end of this process, viz., the so-called ' spontaneous ' rupture of the vessel.

In this way the arachnoid bleedings in young and otherwise healthy persons may be satisfactorily accounted for."

R. R. J.

BOOK NOTICE

On Deficiency of A Vitamin and Visual Dysaptation. By C. EDMUND and SV. CLEMMESCEN. Pp. 192. Copenhagen: Levin and Munksgaard. London: Humphrey Milford. 1936. Price, 5/-.

It is known that the power of distinguishing variations of light found in individuals suffering from lack of vitamin A is inferior to that of normal persons placed in similar circumstances. The authors state that a discussion of the duplicity theory is outside the scope of their work; but they emphasize that, "on the basis of the results derived from our experiments, we deem it probable that the eye disposes of one means only for adjusting itself to varying light. This property belongs to both cones and rods, though perhaps not to the same degree." This efficiency they propose to call the power of aptation of the eye. Their experiments were carried out at the Gundby Hospital, Copenhagen, on hospital nurses, medical cases and pregnant women. The results are largely shown in tabular form; and an elaborate diet for hospital nurses is added.

An appendix contains a paper by the same authors on "Parenteral A vitamin Treatment of Dysaptatio (Nyctalo-hemeralopia) in some pregnant women."

An abstract of the authors' summary of the first part of their work will give our readers some idea of the scope of their work.

"About half the pregnant women admitted to a municipal hospital department, *i.e.*, women with complicated pregnancy, present dysaptation.

In medical patients, dysaptation is above all detected in women who have recently given birth, in patients with protracted hepatitis where vomiting has compromised nutrition, and in the case of a child with pyelitis. If eye diseases and pregnancy are excluded, dysaptation is found in only 5 to 6 per cent. of ordinary medical patients.

Neither the diets usually given, nor the administration of paraffin oil for brief periods, nor achylia gastrica, have favoured the occurrence of dysaptation. While the ordinary hospital diet has not given rise to dysaptation, they found that in the month of March the power of distinction of young nurses, who are treated with vitamin, can be raised from the lower limit of the normal zone to the upper limit, which tends to suggest a deficiency of vitamin in the diet."

CORRESPONDENCE

"POSTERIOR NEEDLING" IN THE TREATMENT OF LAMELLAR AND OTHER FORMS OF SOFT CATARACT

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIRS,—I have to thank you for your courtesy in allowing me to read Mr. Hepburn's letter, which seems to call for a reply.*

Re-reading my paper, I do not think I have been guilty of much, if any exaggeration. The paragraph to which Mr. Hepburn takes most exception is that referring to the advantages of the posterior operation, in which I indicate the ideal course of the anterior operation, the uncertainty regarding the rate of swelling of the lens, the possibility of curette extraction at an early stage, and the complications which may arise if this has to be done when tension has risen or the eye has become irritable.

I have no difficulty in believing that Mr. Hepburn gets excellent results from the anterior operation, especially if he performs a curette extraction when lens matter comes forward into the anterior chamber; but I think he will admit that a curette extraction is a "bigger" operation than a needling in a young child, and is more likely to require a general anaesthetic. Incidentally, it also brings up the number of operative procedures to at least three. My remarks about "unfavourable conditions" and the use of a general anaesthetic referred, of course, to those cases where, in the hope that the dissolving lens will become spontaneously absorbed, an early curette evacuation has not been done, and iritis or rise of tension has supervened. Although it is many years since I did an anterior operation for infantile or juvenile cataract, I have seen the complications referred to, and I do not think I exaggerate their importance unduly. Taking down from my shelves half-a-dozen text-books and three or four volumes on the operative surgery of the eye, I find that they all speak of the possibility of such complications of the anterior needling operation in more or less emphatic terms. Moreover, the explanations they offer show that there is still no agreement as to the kind of incision which will enable us to avoid them. Is it likely that all these authors would refer to such occurrences if they had not come within their experience?

As regards Mr. Hepburn's statements that "swelling of the lens can only take place when the capsule is intact or practically intact," and "to talk of swelling of the lens when masses of

* Professor Ballantyne's letter did not reach us in time to be included in the November issue.—*Editors.*

opaque lens matter are protruding from the opening in the capsule and filling the anterior chamber, is a mistaken use of the term," I find them bewildering. To what extent can a lens swell when its capsule is intact? A lens capsule which has been needled, however imperfectly, may be " practically intact," according to Mr. Hepburn's nomenclature; but it is not intact; and if a needled lens imbibes fluid, and thereby becomes more bulky than it was before needling, surely " swelling " is an appropriate name for the process.

If my memory serves me, the experiments of Sir J. H. Parsons, referred to by Mr. Hepburn, consisted in passing a needle or knife across the vitreous chamber to wound the retina and choroid at the opposite side of the globe, and were conducted in association with a study of the scars produced by metallic foreign bodies. The conditions here are scarcely comparable with those of the posterior needling operation. In any case, my paper was not concerned with theoretical considerations of what might or should happen, but with the practical question of what does happen.

Finally, while I recommend the posterior needling operation primarily just because I believe it to be the " safest and best for the patient," I think that questions of cost in time and money are not irrelevant in the choice of an operation. To most of our patients in Glasgow, and I fancy in London, expense is an important consideration, and, hospital waiting-lists being what they are, anything which reduces the demand for beds is usually welcomed.

Yours faithfully,

A. J. BALLANTYNE.

11, SANDYFORD PLACE,
GLASGOW, C.3. *October 20, 1936.*

OBITUARY

FRANK CRESSWELL

IT is with great regret that we record the death on October 6, of Mr. Frank Pearson Skeffington Cresswell of Cardiff. He was born at Dowlais, Glam., where his father had a great reputation as surgeon to the Dowlais Iron Works. Educated at Christ's College, Brecon, and at University College, Cardiff, he came to London for his medical training and entered Guy's Hospital. He took the B.Sc.Lond. in 1887 and qualified M.B., B.S.,Lond. in 1893, proceeding to the F.R.C.S.Eng. in 1894. At Guy's he came under the influence of Charles Higgins and Brailey and, after a period

of post-graduate work at Utrecht, he became a clinical assistant at Moorfields. He returned to Wales to act as senior resident medical officer to the Cardiff Infirmary, and on the expiration of this appointment started to practise as an ophthalmic surgeon in Cardiff.

Cresswell joined the Ophthalmological Society of the United Kingdom in 1899 and served for a period on the council. Practising, as he did, in a large mining centre, he became a recognised authority on miners' nystagmus and though he did not write much, his opinion was sought and valued over a wide area.

In addition to a large private practice, Cresswell held many hospital appointments, the chief of which was that of ophthalmic surgeon to the Cardiff Infirmary. He was also attached to the Aberdare and Merthyr Hospitals as consultant in eye cases and he was surgeon to the South Wales Institute for the Blind, as well as ophthalmic referee for cases in South Wales and Monmouthshire. He had been at one time hon. secretary to the Cardiff Medical Society and, until he reached the retiring age, he was lecturer in ophthalmology to the Welsh National Medical School.

LIEUT.-COL. R. H. ELLIOT, I.M.S.

Robert Henry Elliot, who died on November 9, had a distinguished career in more ways than in ophthalmology. The son of a Colonel in the Army he was educated at Bedford School and St. Bartholomew's Hospital. He had a brilliant career as a student and qualified M.B., Lond. in 1890, with honours in obstetrics and forensic medicine. In the following year he took the B.S., again with honours. He passed the examinations for the F.R.C.S., Eng. and the D.P.H., Cantab. in 1892, and proceeded M.D., Lond. in 1895. In 1904 he became D.Sc., Edin.

Elliot entered the Indian Medical Service and was Montefiore medallist and scholar in military surgery and Maclean prizeman at Netley in 1892.

His work in India naturally led to a very large experience in operative ophthalmology which resulted in his being Superintendent of the Government Ophthalmic Hospital, Madras, for ten years, 1904-1914. During this period he was also Professor of Ophthalmology at the Madras Medical College. He became a life member of the Ophthalmological Society in 1902. At the Seventeenth International Congress of Medicine in 1913 he was a reporter on the subject of operations for glaucoma.

On his return to this country he settled at 54, Welbeck Street, and rapidly acquired a very large practice. In 1917, Elliot was Hunterian Professor at the Royal College of Surgeons, and his lectures on " the Indian Operation of Couching for Cataract "

were afterwards published in book form and reviewed in our columns, Vol. 2. He was also Chairman of the Naval and Military Committee of the British Medical Association from 1917 to 1922.

Elliot's work on sclero-corneal trephining for glaucoma brought him many distinctions, including the hon. fellowship and gold medal of the American Academy of Ophthalmology and Oto-Laryngology, the hon. membership of the Ophthalmological Societies of Egypt, Detroit, Chicago, Minnesota and the Pacific Coast. He was Ophthalmic Surgeon for a time to the Prince of Wales' Hospital, Tottenham, and hon. Consulting Ophthalmic Surgeon to the London Hospital for Tropical Diseases. He was also Vice-President of the Institute of Hygiene, and Chairman of the Executive Committee of the British Health Resorts Association. In all these capacities Elliot made his driving force felt and he accomplished much good work.

His literary output was considerable. For many years he was the Madras correspondent of *The Ophthalmoscope*, and he collaborated in the production of The Ophthalmic Year Book in 1912, 1913, 1924. His book on Sclero-corneal Trephining ran into two editions, as did his Treatise on Glaucoma. Besides these he wrote a handbook on Glaucoma for the General Practitioner, and a manual of Tropical Ophthalmology which was translated into many foreign languages, and a small work on Ophthalmic Nursing.

Upon Elliot's interests outside ophthalmology such as snakes and illusions, this is not the place to enlarge; but his " Myth of the Mystic East " which appeared in 1934, should be remembered. He was a first class amateur conjurer and as Chairman of the Occult Committee of the magic circle he did much investigation of numerous exhibitions of magic. It will be remembered that his conclusion anent the Indian rope trick was that no such trick had ever been performed. On snakes Elliot was a great authority.

Elliot's work on sclero-corneal trephining first appeared in *The Ophthalmoscope* in December, 1909, as a preliminary report on 50 cases. It led to much discussion with regard to priority and the older members of the profession will probably remember the spate of correspondence on this subject at the time: Freeland Fergus, of Glasgow, had operated by trephining the sclera since early in 1909, had read a paper at the meeting of the British Medical Association in Ireland in that year and had performed his operation at the Oxford Ophthalmological Congress. But beyond the report in the British Medical Journal he had not published anything. Like most beginners in this operation, Freeland Fergus found that he was not always able to place his trephine sufficiently far forwards to tap the anterior chamber. If the iris

did not prolapse he was wont to pass a spatula forwards into the anterior chamber, thus combining a cyclodialysis with his scleral trephining. Elliot was the first to insist on dissecting a short way into the cornea before applying the trephine, and his work has, of course, stood the test of time; the operation has been known by his name all over the world.

The magnificent buildings of the Government Ophthalmic Hospital and School at Madras are a lasting memorial to him.

Mrs. Elliot died eleven years ago and of late Col. Elliot had been in bad health. To his three sons the sympathy of the ophthalmic fraternity will be extended.

NOTES

Oculi Sunday

IN the Church of Boughton Monchelsea, near Maidstone, is a tombstone to a certain Sarah Tomkin, "who having been blind for twelve years was restored to sight on Oculi Sunday, the third Sunday in Lent, March 19, 1863, aged 74 years."

The Vicar, the Rev. R. H. Rush, to whose kindness I owe this transcript, tells me that he thinks that the reference "restored to sight" is intended in a spiritual sense and not that the physical blindness was miraculously cured. In view of the recent date I think there is no question that this is the correct view.

Oculi Sunday was the third Sunday in Lent in pre-Reformation times on account of the 15th verse of the 25th Psalm which was used as an antiphon on that day. At the Reformation antiphons ceased to be used. The verse in question runs: "Mine eyes are ever toward the Lord; for He shall pluck my feet out of the net."

The use of the phrase "Oculi Sunday" so late as the year 1863 is a quaint and interesting survival of past times.

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International Organization against Trachoma

"THE International Organization of the Campaign against Trachoma" was instituted at the XIIIth International Congress of Ophthalmology at Amsterdam in 1929. An Executive Committee for the Organization was elected at a Meeting held at Geneva in 1930 which was attended by 64 delegates from 32 ophthalmological societies.

The objects of the Organization were enunciated in the following terms:—

(1) To help in the collaboration of the different organizations which combat trachoma.

(2) To work in concert with the International Organization of Public Health of the League of Nations.

(3) To institute enquiries into the geographical distribution, the gravity and the sequelae of the disease.

(4) To observe all measures relative to the strife against trachoma, to assist with these measures and to propagate a knowledge of them.

(5) To organize meetings to consolidate the scientific bases of the struggle against trachoma, to elucidate the problem of its aetiology, of its profound causes, of the diagnosis, of the pathology, of the therapeutics, and of the prophylaxis, as well as the scientific and social questions concerned, in order to propose the legislative measures which are indicated.

Scientific meetings have been held in Madrid in 1933, in Paris in 1934, in London in 1935, and in Paris in 1936, when important communications on various aspects of trachoma, aetiological, epidemiological and therapeutic were made by well-known trachomatologists. Reports of these have been published in the trimestrial journal, "La Revue Internationale du Trachome," copies of which can be obtained ***only*** from the offices of the journal (M. Terroux, 8, Rue d'Ulm, Paris V, price 12 francs).

The scientific meetings of "The International Organization against Trachoma" are held annually in April or May. They may be attended by any medical man who becomes affiliated to the Organization by the payment of an annual subscription of the exchange value of 10 Swiss francs.

Reports of the scientific proceedings of the Organization will continue to be published in "La Revue Internationale du Trachome" ("The International Review of Trachoma"). This journal has been adopted as the official organ of the Organization at a meeting of the Executive Committee held in Paris on May 11, 1936. The annual subscription to the journal which appears every three months is 45 French francs. Articles of interest are received in any language, and an abstract in French, English, German, Italian or Spanish is appended to each.

Since its inauguration the expenses of "The International Organization against Trachoma" have been supported by donations from twenty of the National Ophthalmological Societies. The accounts published on May 1, 1936, show only a small credit balance. It is hoped that all those who are interested in trachoma will become annual subscribers.

In order to facilitate the payment of subscriptions to the Organization and to "The International Review of Trachoma" by those who are not already subscribers to either, arrangements have been made as follows, since the Organization cannot maintain a secretariat, and all work on its behalf is honorary. All subscriptions must be sent by a bank to the credit of "The International Organization against Trachoma" at the National Provincial Bank, 23, Wigmore

Street, London, W. The subscription to the Organization alone is thirteen shillings sterling; the combined subscription to the Organization and to "The International Review" is one pound five shillings sterling.

The present constitution of the Executive Committee of The International Organization against Trachoma is as follows:—President: MacCallan, 33, Welbeck Street, London, W.; Secretary General: Wibaut (Holland); Vice-Presidents: Birch-Hirschfeld (Germany), Marquez (Spain), Park Lewis (U.S.A.); Szymansky (Poland); Members: Brandés (Belgium), Kadlicky (Czecho-Slovakia), Miyashita (Japan); Members *ex-officio*: de Lapersonne (France), van der Hoeve (Holland); Honorary Member: de Grosz (Hungary).

A business meeting will be held during the period of the International Congress of Ophthalmology which takes place in Cairo from December 8 to 14, 1937.

According to the statutes this will be attended only by annual subscribers and by duly nominated delegates from National Ophthalmological Societies, from the International Congress of Ophthalmology, from the League of Nations and from the International Association for the Prevention of Blindness. In countries where there is no Ophthalmological Society delegates may be appointed by the Government.

At this meeting members of the Executive Committee will be elected to serve for a period of five years.

Owing to the uncertainty of the exchange value of both the French and Swiss francs, the amounts of these currencies given above will be altered officially later. The sterling amounts are correct.

During the period of the International Congress of Ophthalmology to be held in Cairo from December 8 to 14, 1937, meetings will be held of "The International Organization of the Campaign against Trachoma."

The Scientific Sessions, which are open to all ophthalmologists, will be occupied as follows:—

(1) Introductory address by the President.

(2) The Micro-biological Aetiology of Trachoma. Only new work since the date of the last International Congress of Ophthalmology will be considered.

Reporters—Stewart, Thygeson, Rötth, Juliannelle.

(3) The Pathology of Trachoma from different aspects.

Reporters—Wilson, Mikhail, Sobhy, Busacca, El-Kattan, I. A. Mohammed, Farid Masoud.

Owing to the fact that the International Council of Ophthalmology can allocate only two sessions to this Organization, it is possible that there may be insufficient time to deal with independent subjects. However, if, owing to their originalty and interest, papers

on other subjects are offered by members of the Congress or by annual subscribers to the International Organization against Trachoma they may be accepted.

The number and size of lantern slides, if any, should be stated, and whether an epidiascope or microscope (and, if so, how many) are required for the lecture.

The time allowed for the Reporters will be 15 minutes, for speakers who have sent in papers 10 minutes, and for discussion 5 minutes.

Papers by Reporters and *by others who desire to take part*, in order to obtain publication in the official reports of the International Congress of Ophthalmology must comply as follows: All papers in triplicate, with a resumé of not more than 500 words, must be in the hands of Dr. Marx, the Secretary-General of the International Congress of Ophthalmology, 316 Oostzeedijk, Rotterdam, Holland, by April 1, 1937.

The Business Session will be attended only by annual subscribers to the International Organization against Trachoma and by duly nominated delegates.

FUTURE ARRANGEMENTS

1936

December 1.—Midland Ophthalmological Society, at Birmingham Eye Hospital (Middlemore Lecture).

December 4.—North of England Ophthalmological Society, at Leeds.

December 11.—Royal Society of Medicine; Section of Ophthalmology (Clinical Meeting).

1937

January 8.—Royal Society of Medicine; Section of Ophthalmology.

January 29.—North of England Ophthalmological Society, at Sheffield.

February 1.—North of England Ophthalmological Society, at Manchester.

February 2.—Midland Ophthalmological Society, at Derbyshire Royal Infirmary, Derby.

February 5.—North of England Ophthalmological Society, at Newcastle-on-Tyne.

February 12.—Royal Society of Medicine; Section of Ophthalmology.

March 5.—North of England Ophthalmological Society, at Liverpool.

March 12.—Royal Society of Medicine; Section of Ophthalmology (Clinical Meeting).

April 9.—North of England Ophthalmological Society, at Sheffield.
April 16.—Midland Ophthalmological Society, at the Nottingham Eye Infirmary.
June 4.—Midland Ophthalmological Society, at Shrewsbury Eye Hospital.
June 11.—Royal Society of Medicine; Section of Ophthalmology (Annual).
October 1.—Midland Ophthalmological Society, at the Eye Hospital, Birmingham (Annual Meeting).
December 7.—Midland Ophthalmological Society, at Birmingham Eye Hospital (Middlemore Lecture).

CONTEMPORARY OPHTHALMIC LITERATURE

Archives d'Ophtalmologie. *October, 1936.*

TERRIEN and VEIL. Anatomico-clinical study of a case of naevo-cancer of the caruncle.
PANNETON. Blepharo-chalazis.
DIMITRU. Resultant facts of observations of 349 cases of hereditary syphilitic keratitis.

Revue d'Oto-Neuro-Ophtalmologie. *September-October, 1936.*

ABOULKER. About vertigo, medico-surgical syndrome.
MANOLESCO, LAZARESCO and SCHMITZER. Contribution to the study of tumours of the sellar region.
SÉDAN. Intermittent diplopia preceding orbital encroachment of a frontal mucocele.

Klinische Monatsblätter für Augenheilkunde. *October, 1936.*

BIRCH-HIRSCHFELD. The five-point adaptometer for determining the light sense in the new improved form.
HORÁNSZKY. Geniculate body and visual cortex in monocular optic atrophy.
SONDERMANN. Intra-ocular tension and intra-vascular pressure in the eyes.
KOKOTT. The question of the short-wave treatment of the eyes. Investigations on the calefaction of the vitreous humour in rabbits' eyes from short-wave irradiation with a tubular projector.
PFLIMLIN and STRÜBIN. Research on the binocular visual process.
ST. V. GROSZ. Aetiology and therapy of keratoconjunctivitis.
V. PAPOLCZY. Metastases of a carcinoma of the breast in both eyes.
NEUMANN. The dependence of the pupillary distance on the inter-orbital distance in normal and squinting eyes.
SUGANUMA. Study of the blood pressure in the central retinal artery.
CSILLAG. Experimental investigations on animals' eyes to establish the resistance capacity of the lens capsule.

Bollettino d'Oculistica. *September, 1936.*

CAPPETTA and MOTOLESE. Juvenile glaucoma.
BIETTI. Haemoangioendothelioma of unusual aspect with increased intravascularization, developing on the anterior wall of the lacrymal sac.

Revista Oto-Neuro-Oftalmologica y de Cirugia Neurologica *July-August, 1936.*

DI MARZIO, CAVINA and DE NEGRIS. Arachnoiditis of the optic chiasma.
TOMMASINI and MATTIUCCI. Blindness from symmetric metastatic abscesses of the occipital lobes and right hemiplegia from abscesses of the left parietal lobe.
RUBINO, AGOSTINO and RUBINO, ALFIO. Cystic tumour of the 3rd ventricle with prevalent ocular symptoms.